CLAIMS

1. In a radio communication system including a first transceiver, a second transceiver and a repeater, the first and second transceivers being separated from each other by a distance greater than at least one of their respective maximum transmission ranges, and the repeater being located intermediate the first and second transceivers, the method including:

upon receiving data from one of either the first or second transceivers, the repeater transmits a repeater flag to cause the transceivers to suspend further action and then transmits the data received from the one of either the first or second transceivers.

2. A method according to claim 1 wherein the first and second transceivers transmit an acknowledgement indicating the successful or unsuccessful receipt of the data transmitted by the repeater.

3. A method according to claim 2 wherein upon receipt of the acknowledgements from each of the first and second transceivers, the repeater will transmit an overall status for the repeated transmission.

4. A communications protocol for use in a network of devices, the protocol having a frame including a first time slot for transmitting data, a second time slot, after the first time slot, for indicating a repeat flag, and a third time slot, after the second time slot, for retransmitting the data transmitted in the first time slot.

5. A communications protocol according to claim 4 further including a fourth time slot, after the third time slot, for allowing acknowledgement of a successful or unsuccessful receipt of the data by devices intended to receive the data.

6. A communications protocol according to claim 5 wherein the fourth time slot is divided into a first sub-time slot for indicating a positive acknowledgement, and a second sub-time slot for indicating a negative acknowledge.

7. A communications protocol according to claim 6 in which the first and third time slots are variable in length and the first and second sub-time slots are fixed in length.

8. A communications protocol according to claim 6, wherein the positive acknowledge includes the transmission of a specific coded value containing sufficient redundancy to allow it to be recovered in the presence of received errors, and the negative acknowledge includes the transmission of a specific coded value containing sufficient redundancy to allow it to be recovered in the presence of received errors.

9. A communications protocol according to claim 7 further including a fifth time slot for transmitting an overall status to the network.

10. A radio communication system including a first transceiver, a second transceiver and a repeater, the first and second transceivers being separated from each other by a distance greater than at least one of their respective maximum transmission ranges, and the repeater being located intermediate the first and second transceivers, wherein upon receiving data from one of either the first or second transceivers, in a first time slot, the repeater transmits a repeater flag in a second time slot to cause the transceiver to suspend further action, and then in a third time slot transmits the data received in the first time slot.

11. A radio communication system according to claim 10 wherein the first and second transceivers transmit, in a fourth time slot, an acknowledgement indicating the successful or unsuccessful receipt of the data transmitted in the third time slot.

12. A radio communication system according to claim 11 wherein the first and second transceivers transmit a positive acknowledge in a first of two sub-time slots of the fourth time slot or transmit a negative acknowledge in a second of two sub-time slots of the fourth time slot.

13. A radio communication system according to claim 11 wherein in a fifth time slot, the repeater transmits to all transceivers an overall status for the repeated transmission.

14. A repeater for use in a radio communication system including at least two transceivers, the at least two transceivers being separated from each other by a distance greater than at least one of their respective transmitting ranges, in use, the repeater being disposed intermediate the at least two transceivers wherein upon receiving data in a first time slot, the repeater transmits a repeat flag in a second time slot to cause the transceivers to suspend further action, and then transmits in a third time slot, data received in the first time slot.

15. A repeater according to claim 14 wherein upon receiving acknowledgement data from the at least two transceivers in a fourth time slot, the repeater transmits an overall acknowledge status in a fifth time slot.

16. A transceiver for use in a radio communication system including at least one other transceiver and a repeater, the transceiver and the at least one other transceiver being separated from each other by a distance greater than at least one of their respective transmitting ranges, in use, the repeater being disposed

intermediate the transceiver and the at least one other transceiver, wherein upon receiving a repeat flag from the repeater, in a second time slot, the transceiver suspends further action until it receives from the repeater, in a third time slot, data that was originally transmitted by the at least one other transceiver in a first time slot, before the second time slot.

17. A transceiver according to claim 16 wherein in a fourth time slot, the transceiver transmits an acknowledgement indicating the successful or unsuccessful receipt of the data transmitted in the third time slot.

18. A transceiver according to claim 17 wherein the transceiver transmits a positive acknowledge in a first of two sub-time slots of the fourth time slot, or transmits a negative acknowledge in a second of two sub-time slots of the fourth time slot.

19. A method for use in a radio communications system including at least a first transceiver, a second transceiver and a repeater, the first transceiver and the second transceiver being separated by a distance greater than a maximum transmission range of at least one of the transceivers, and the repeater being disposed intermediate the first and second transceivers, such that upon receipt of a data transmission from the first transceiver, the repeater re-transmits the data transmission from the first transceiver, wherein upon receipt of a data transmission from the second transceiver before the repeater completely receives or retransmits the data transmission from the first transceiver, the repeater transmits a data sequence instructing each transceiver to cease its respective transmission.

20. A method according to claim 19 wherein the respective transmissions of the first and second transceivers are headed by a sequence of consecutive dominant bits.

21. A method according to claim 20 wherein the data sequence transmitted by the repeater begins with a sequence of dominant bits.

22. A method according to claim 21, the method further including upon receiving the data sequence from the repeater, causing each transceiver to cease transmitting, each transceiver will delay for a period before attempting to repeat its original transmission.

23. A method according to claim 21 wherein the delay period is calculated by each transceiver by selecting a random number and scaling the random number according to the number of bits in its respective transmission.

24. A method according to claim 23 wherein if subsequent transmission retries still collide, subsequently calculated delay periods are increased.

25. A method according to claim 24 wherein after a predetermined number of unsuccessful retries, the transceiver ceases further transmission attempts.

26. A method according to claim 25 wherein after ceasing further transmission attempts, the network alerts an operator that further transmission attempts have ceased.

27. A radio communications system including at least a first transceiver, a second transceiver and a repeater, the first transceiver and the second transceiver being separated by a distance greater than a maximum transmission range of at least one of the transceivers, and the repeater being disposed intermediate the first and second transceivers, such that upon receipt of a data transmission from the first transceiver, the repeater re-transmits the data transmission from the first transceiver, wherein upon receipt of a data transmission from the

second transceiver before the repeater completely receives or re-transmits the data transmission from the first transceiver, the repeater transmits a data sequence instructing each transceiver to cease its respective transmission.

28. A radio communications system according to claim 27 wherein respective transmissions of the first and second transceivers are headed by a sequence of consecutive dominant bits.

29. A radio communication system according to claim 28 wherein the data sequence transmitted by the repeater begins with a sequence of dominant bits.

30. A radio communications system according to claim 29 wherein upon receiving the data sequence from the repeater causing each transceiver to cease transmitting, each transceiver delays for a period before attempting to repeat its original transmission.

31. A radio communications system according to claim 30 wherein the delay period is calculated by each transceiver by selecting a random number and scaling the random number according to the number of bits in its respective transmission.

32. A radio communications system according to claim 31 wherein if subsequent transmission retries still collide, subsequently calculated delay periods are increased.

33. A radio communications system according to claim 32 wherein after a pre-determined number of unsuccessful retries, the transceiver ceases further transmission attempts.

34. A radio communications system according to claim 33 wherein upon further transmission attempts ceasing, the radio communication system alerts an operator to the fact that further transmission attempts have ceased.

35. A repeater for use in a radio communication system including at least a first transceiver and a second transceiver, the first transceiver and the second transceiver being separated by a distance greater than a maximum transmission range of at least one of the transceivers, in use, the repeater being disposed intermediate the first and second transceivers such that upon receipt the data transmission from the first transceiver, the repeater retransmits the data transmission from the first transceiver, wherein upon receipt of a data transmission from the second transceiver before the repeater completely receives or re-transmits the data transmission from the first transceiver, the repeater transmits a data sequence instructing each transceiver to cease its respective transmission.

36. A repeater according to claim 35 wherein the data sequence transmitted by the repeater is a sequence of dominant bits.

37. A transceiver for use in a radio communication system including at least one other transceiver and a repeater, in use, the transceiver and the at least one other transceiver are separated by a distance greater than a maximum transmission range of at least one of the transceivers, and the repeater being disposed intermediate the transceiver and the at least one other transceiver, such that upon receipt of a data transmission from the at least one other transceiver, the repeater re-transmits the data transmission from the at least one other transmitter and upon receipt of the data transmission from the transceiver before retransmitting the data transmission from the at least one other transceiver, the reporter transmits a data sequence instructing each

transceiver to cease respective transmissions, wherein, upon receipt of the data sequence from the repeater, the transceiver will cease transmission.

38. A transceiver according to claim 37 wherein the transmission from the transceiver is headed by a sequence of consecutive dominant bits.

39. A transceiver according to claim 38 wherein upon receiving the data sequence from the repeater, the transceiver delays for a period before attempting to repeat its original transmission.

40. A transceiver according to claim 39 wherein the delay period is calculated by the transceiver by selecting a random number and scaling the random number according to the number of bits in its transmission.

41. A transceiver according to claim 40 wherein if subsequent re-transmissions still result in receipt of a data sequence from the repeater, the transceiver will increase subsequent delay periods before re-transmitting its original transmission.

42. A transceiver according to claim 41 wherein after a pre-determined number of unsuccessful re-transmission attempts, the transceiver will cease further transmission attempts.

43. A transceiver according to claim 42 wherein upon ceasing further transmission attempts, the transceiver will alert an operator to the fact that further transmission attempts have ceased.